

App. No. 09/843,597

Request for continued examination under 37 CFR §1.114

**REMARKS**

Claims 39, 41-50, 64-66, 75, 81, 82, and 85-136 are pending and under consideration. Claims 39, 64, 75, and 81 are independent claims. Claims 1-38, 51-63, 67-74, 76-80, 83, and 84 drawn to non-elected inventions were previously cancelled. Claim 39 has been amended. Reexamination and reconsideration of the application, as amended, are hereby respectfully requested.

***Interview Summary***

Applicant thanks the Examiner for courtesies extended during a telephone interview with Applicant's Agent on 04/18/2005, particularly in light of the fact that the Examiner has only recently had this application transferred to him from another Examiner. The substance of the interview was focused on a discussion of the exact meaning of the phrase "diffractive element", and a general discussion of collective action of the diffractive elements versus individual action of a diffractive element. Also discussed were claims of Pat. Nos. 6,859,318 and 6,876,441 (issued on the parent of the instant application), which incorporate language similar to that of the pending claims. No specific agreement was reached as to the allowability of any specific claim, however, the Examiner acknowledged that the individual action of diffractive elements as recited in the pending claims might distinguish over the cited prior art (Kenan, US4006967). The Examiner indicated that he still must make a more detailed review of the prior art cited in this application and the parent cases, and that he will likely perform an additional search.

***Clarification of Claim Terminology***

During the interview of 04/18/2005, the meanings of the phrases "diffractive element" and "diffractive element set" were discussed. The Examiner expressed concern that referring to each individual element as a "diffractive element" might lead to confusion, since in some instances an individual element might not diffract an optical signal. Applicant's Agent agreed that in some instances, for example, an *individual* element might *reflect* a portion of the optical signal, while the *collective* action of the element set might be properly characterized as *diffraction*. Accordingly, Applicant sets forth the following to clarify the phrases "diffractive element" and "diffractive element set".

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A *diffractive element* comprises some alteration of an optical medium that diffracts, reflects, scatters, or otherwise redirects a portion of an incident optical signal propagating in the medium. This process often may be referred to as diffraction, and the element referred to as a diffractive element, even if the physical process of light interacting with the an *individual* element is not diffraction per se. In the pending claims, each diffractive element is recited as being "*individually* contoured and positioned so as to reflectively image at least a portion of an input optical signal between an input optical port and an output optical port". In other words, each element achieves the reflective imaging regardless of the presence or absence of other diffractive elements in the set.

As recited in the pending claims, a *diffractive element set* comprises multiple diffractive elements that are *collectively* arranged, with respect to each other and with respect to the optical ports, "so as to comprise temporal, spectral, or spatial transformation information". In other words, imparting of the "temporal, spectral, or spatial information" onto the optical signal requires the presence of multiple diffractive elements in a particular relative arrangement. Since the *collective* action of the set may be characterized as diffraction, it is reasonable to refer to *individual* elements thereof as "diffractive elements", even if they do not diffract individually.

### ***Claim Rejections***

In the Office Action of 01/12/2005, Claims 39, 41-50, 64-66, 75, 81, 82, and 85-136 were variously rejected under 35 USC §§ 102 and 103 as unpatentable over Kenan (US 4006967) and Cullen (US 6323970). Applicant respectfully traverses the rejections, since it is believed that Claims 39, 41-50, 64-66, 75, 81, 82, and 85-136, as amended herein, patentably distinguish over Kenan and Cullen.

With respect to Claims 39, 64, 75, and 81, each of these independent claims recites that the holographic structure comprises a set of diffractive elements, each of which *individually* provides reflective imaging of at least a portion of an optical signal between the input optical port and the output optical port. This is disclosed in Fig. 4, for example, where each of diffractive elements 402 is individually contoured (concentric circles) and positioned (centered between ports 404 and 406) so as to individually image portions of an optical signal between optical ports. It is asserted in the Office Action that Kenan discloses

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each diffractive element of the set is individually contoured and positioned ... so as to reflectively [alt. *diffractively*] image at least a portion of an input optical signal between a input optical port and an output optical port as the input optical signal propagates within the holographic structure

Applicant respectfully submits that this assertion is erroneous. First, the redirection of beam 11 into beam 13 by Bragg grating 15 (Fig.1; other figures analogous) occurs only through the *collective* action of the grating lines of the Bragg grating. Individual grating lines of Bragg grating 15 do not reflectively image any optical signals. Since a limitation recited in Claims 39, 64, 75, and 81 is not disclosed by Kenan, Applicant respectfully submits that rejection under 35 USC § 102 is improper and respectfully requests withdrawal of the same. Since there is no teaching, suggestion, or motivation disclosed in Kenan or Cullen for providing reflective imaging of optical signals by individual elements, rejection under 35 USC § 103 would also be improper.

Regarding Claims 85, 105, 118, and 130, (dependent on Claims 39, 64, 75, and 81, respectively), each of these dependent claims recites that "the diffractive elements of the set are collectively arranged ... so as to exhibit positional variation in amplitude, optical separation, or spatial phase over some portion of the set." It is asserted in the Office Action that

Kenan et al at least implicitly disclose wherein said diffractive elements of the set are collectively arranged so as to exhibit positional variation in at least optical separation [claim 85], based on the change in index of refraction [optical path length being a function of refractive index]

Applicant respectfully submits that this assertion is erroneous. While Kenan does disclose variation with applied voltage of the refractive index for altering the optical separation of the grating lines of Bragg grating 15 (thereby altering the Bragg wavelength and/or Bragg angle), nowhere does Kenan disclose a *positional* variation of the optical separation *over some portion of the set*. In other words, to meet this claim limitation, a disclosed Bragg grating must have an optical separation (or amplitude or spatial phase) that varied *with position within the set*. No such structures are disclosed by Kenan, explicitly or implicitly. Since a limitation recited in Claims 85, 105, 118, and

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130 is not disclosed by Kenan, Applicant respectfully submits that rejection under 35 USC § 102 is improper and respectfully requests withdrawal of the same. Since there is no teaching, suggestion, or motivation disclosed by Kenan or Cullen for providing positional variation of amplitude, optical spacing, or spatial phase over some portion of a diffractive element set, rejection under 35 USC § 103 would also be improper.

Regarding Claims 103, 116, 123, and 135 (dependent on Claims 39, 64, 75, and 81, respectively), each of these dependent claims recites that the holographic structure is configured by introduction of energy through a conductive trace that is "positioned and contoured to substantially correspond to one of the diffractive elements". It is asserted in the Office Action (regarding Claims 103, 123, and 135) that: "Kenan et al explicitly teach wherein at least one conductive trace is positioned and contoured so as to substantially correspond to one of the diffractive elements. Please see Fig. 1, especially 16, 17 w/r/t Bragg grating 15". Applicant respectfully submits that this assertion is erroneous. Electrical traces 16 and 17 in Fig. 1 *do not* correspond in position and contour to the grating lines of Bragg grating 15. The electrodes clearly cross the grating lines at an angle. In order to meet the limitation recited in Claims 103, 116, 123, and 135, the traces 16 and 17 would have to be oriented substantially parallel to the grating lines, and would have to be spaced at substantially the same spacing as the grating lines (or integer multiples thereof). Such an arrangement is not disclosed in Kenan. Analogously, a curved diffractive element would require a similarly curved conductive trace (as in Figs. 4-6, 9, and 10 of the present application). Since this limitation recited in Claims 103, 116, 123, and 135 is not disclosed by Kenan, Applicant respectfully submits that rejection under 35 USC § 102 is improper and respectfully requests withdrawal of the same. Since there is no teaching, suggestion, or motivation disclosed by Kenan or Cullen for providing a conductive trace positioned and contoured to substantially correspond to one of the diffractive elements, rejection under 35 USC § 103 would also be improper.

Regarding Claim 104, 117, 124, and 136 (dependent on Claims 39/41, 115/64, 122/75, and 134/81, respectively), each of these dependent claims recites that the holographic structure is configured by introduction of energy through multiple conductive traces with independent control of subsets of the multiple traces. It is asserted in the Office Action that

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Kenan et al explicitly teach wherein said energy is introduced through multiple conductive traces, the multiple traces comprising at least two subsets, the energy introduction through each subset ... being independently controlled. Please see Fig. 1, especially 16, 17, each of which are independently controlled (via, i.e., 18, 19).

Applicant respectfully submits that this assertion is erroneous. The control of traces 16 and 17 in Fig. 1 of Kenan is made by means of a single variable voltage source 18 and a switch 19. This can in no way be construed as "independent" control of traces 16 and 17. The only control enabled by Kenan is control of a voltage difference between sets of traces of a diffractive element set, but not independent control of those traces. Figs. 5 and 6 do show multiple, independent voltage sources; but for each diffractive element set shown in those Figures, only a single voltage source is shown controlling a voltage difference between two sets of traces. Since all elements and limitations recited in Claims 104, 117, 124, and 136 are not disclosed by Kenan, Applicant respectfully submits that rejection under 35 USC § 102 is improper and respectfully requests withdrawal of the same. Since there is no teaching, suggestion, or motivation disclosed by Kenan or Cullen for independently controlling multiple sets of traces for a set of diffractive elements, rejection under 35 USC § 103 would also be improper.

### ***Claim Amendment***

Claim 39 has been amended. The phrase "before or after configuring" has been removed from each of the last three clauses of the claim, and has been inserted once after the word "wherein" preceding those three clauses. The phrase "before or after configuring" is meant to denote that the conditions recited in the last three clauses i) may be substantially absent initially and then may arise due to the configuring, ii) may be present initially and then may be substantially eliminated due to the configuring, or iii) may be present initially and then may be altered by the configuring. During the interview of 04/18/2005, it was discussed that repetition of the phrase "before or after configuring" in each of the clauses might be unnecessarily confusing. It was suggested that a single occurrence modifying all three clauses would be more clear, and Claim 39 has been amended accordingly. It should be noted that this amendment was not made for reasons related to patentability, nor is it a narrowing amendment.

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***Conclusion***

In view of the above, it is respectfully submitted that Claims 39, 41-50, 64-66, 75, 81, 82, and 85-136 are in condition for allowance. Allowance of Claims 39, 41-50, 64-66, 75, 81, 82, and 85-136 at an early date is earnestly solicited.

Respectfully submitted,

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